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FESTIVAL DRESS (MISKITO).—M. W. (308) gives us a description of the gala dress of the Miskito which was worn on festal occasions. Besides the loin cloth the men wore cotton bands with bright feathers attached around their wrists and above and below the knees. The body, or the face only, was painted with pinewood charcoal, over which a "varnish" of turpentine was applied. On the breast was a thin plate made of a Spanish dollar piece beaten out flat, the successor of the gold plate met on this coast and in Costa Rica and Panama at the time of Columbus. Between the shoulders was suspended a tube made from a shin bone, with a bunch of feathers, while sea shells depended from the ears. A rod of bone or cane was worn at the pierced septum of the nose; a turtle hook, inserted in a perforation of the lower lip, supported a pendent plate of brass or shell.

Nowadays the Miskito wear on feast days old coats which they have obtained from the foreign residents. The bright-colored necktie, worn sometimes without any collar, is then allowed to fall over the coat. The socks, which are not worn on ordinary occasions, are pulled over the trousers like overboots. Bright-colored handkerchiefs (*aikar*) are also in great favor.

FESTIVAL DRESS (SUMU).—At their festivals the Sumu of to-day paint the entire body red and black, so that it is impossible for them to recognize each other. At such an occasion their only clothing consists of a loin cloth and a headdress (*sira*). The latter is made from the split stem of a kind of bamboo, known locally by the Miskito name *bratara*, from which the bark has been taken off. The different slices are painted and then tied together with black cotton thread, and the cap thus formed is ornamented with the feathers from gaily colored birds, as parrots, macaws, and toucans, or the curly head feathers of the curassow. From this headgear depends a piece of "white tunu" or tree-bark cloth; this part of the cap is called *pakna*. It is painted with various designs, and hangs down the back to the hips. On the neck, wrist, and knee they wear, besides, strings of beads worked into designs; round the upper part of the arm they tie a cotton string to which small feathers have been attached.

HEADGEAR.—Many Indians buy hats which are known by the Spanish name "sombrero" (*sumuru, sumuru*) or the English "straw hat" (*trahat, tarahat*). They are little used in their daily occupations and constitute above all an article of ornament. To the women the hat is, however, unknown, nor is there any other sort of headgear used by them.

FOOTGEAR.—Sandals are not known in the region under consideration, but they are used by the Paya. Moccasins are made occasionally by the Miskito, and shoes are bought in the local shops, but there are no native names for these articles. The women do not use any footgear at all except in the more advanced communities.

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TEETH.—Formerly the Sumu used to file or rather chip their teeth to sharp points; this was a laborious process and was performed by placing a dull knife against the back of the tooth, while the front of it was tapped with a stone implement. 304

EARS.—In 1502, on the testimony of Columbus, certain of the coastal tribes living to the west of Cabo Gracias a Dios, whether Miskito or Paya is uncertain, distended their ears to such an extent "that they might put a hen's egg into them." This statement is confirmed nearly two centuries later by Exquemelin (Sp. ed.: 185; Engl. ed.: 102; French ed.: I, 294–295), who states that the Indians of Rio Xagua (Rio Aguan) on the coast of Honduras were called by the buccaneers "Great Ears" on account of their extraordinary and large ears. Dampier (I, 32) also mentions a curious manner of ear deformation current among the Kukra of Corn Islands during the latter half of the seventeenth century. Both sexes from these islands had their ear lobes pierced during childhood; "by continually stretching with great pegs the opening became as large as a milled five-shilling piece." They wore therein round, smooth pieces of wood, "so that their ears seemed to be all wood with a little skin about them." [171]

LEGS.—From the days of early infancy the Sumu females tie a narrow piece of cotton cloth firmly above the ankle and again below the knee. These bands, if ever removed, are immediately replaced by others. As a result of this custom the parts of the legs thus constricted are very thin, being hardly thicker than the actual bone, whereas the muscles of the calf bulge out to an abnormal degree. This custom, which was observed already by Dampier (I, 32) among the Kukra of the Corn Islands during the latter half of the seventeenth century, is also current among many Carib tribes of South America. Similar bands are occasionally worn by the females at the wrist and below the elbow, but here they serve merely the purpose of ornamentation. [171]

VARIOUS.—Circumcision is said to have been practiced in former days by some of the Sumu tribes, but the writer was unable to obtain any details regarding that custom. Until quite recently the face of the young Sumu was also scarified.

DWELLINGS

VILLAGES.—The villages (M.: *tûnan*, from the English "town"; S.: *asaŭ*) are constructed generally along the waterways, as the sea, lagoons, or rivers, which form the principal means of communication. The Miskito of the lower Rio Coco and of certain parts of the Nicaragua coast have some large villages with from 100 to 500 inhabitants, but the Sumu settlements consist of only two to six huts and count from 6 to 25 inhabitants. On account of the danger from floods the inland villages are often perched upon high banks of the stream. 361

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or other food out of the hot ashes. This tool has also been observed among the Ulwa of Rio Escondido (Wickham, c: 200) and it is very common among the Rama and the Guatuso. The two last-named tribes, however, make these tongs from a small species of palm, the "caña danta" or "ahtak," which they call, like the tool itself, by the names *kiskis* (Rama) and *kaskas* (Guatuso).[32]

MORTARS.—Large wooden mortars (M.: *unu, no*) are found among the Miskito to pound grains and fruits with the aid of a hard wooden pestle (M.: *unu mihta*). The latter is generally single headed and tapers gradually toward the handle end; the double-headed type, which is practically cylinder shaped, is also found occasionally. This mortar has a wide distribution in South America, Africa and Oceania. It was found among the Miskito toward the end of the seventeenth century and is mentioned in those days side by side with the metate (M. W.: 307, 308).

METATES.—The Sumu do not know the wooden mortar, but they employ the metate or mealing stone (M.: *walpa-akbaya;* T., P.: *ki-watak;* U.: *ki-tiknaka*) for grinding maize and cacao and for pounding fruits and berries. The common metate, which may be found in almost every household, is a flat-topped, natural river bowlder, with a rounded waterworn pebble serving as muller or "mano" (M.: *walpa mihta;* S.: *ki mak*).

COOKING VESSELS.—Light tripod iron pots (M.: *dikwa;* S.: *suba, yasama suba*) are now found in every household, and have replaced the earthen vessels (M.: *sumi;* S.: *suba, sau suba*) for cooking purposes. In order to remove the hot pot from the fire the Indians use short wooden sticks with a hook at one extremity, which they put round the ears of the pot; it is known by the following names: M.: *tiñkrus, piñkrus;* T.: *iskrusta;* P.: *pan-alni;* U.: *pan-alka.*

WATER CONTAINERS.—Large calabashes with a small round hole cut in the apex, just large enough to insert a finger, are the common water canteens (M.: *kahmuntara;* T., P.: *sulun;* U.: *taman*). This is the "goat" of the Creoles. Sometimes a corncob is inserted in the opening as a stopper.

Segments of the large species of bamboo are also used to haul water in certain regions. They are made from a section of bamboo stem, so that a nodal septum serves as bottom, while the stem is cut off immediately in front of the next occurring nodal septum.

Fermented beverages are stored in large earthen vessels (M.: *sumi;* S.: *suba, sau suba*); wooden casks of foreign manufacture and homemade troughs are also employed for this purpose.

[32] The Cuna and Chocó Indians of Panama use a similar tool consisting also of a double-bent sliver from the stem of a small palm, while the Ona and Yamana of Tierra del Fuego use a split tree branch for pincers. (Vide E. Nordenskiöld, Comparative Ethnographical Studies, vol. 8, Göteborg, 1930, pp. 65–67.)

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412 met with in certain parts of South America. The ordinary stone ax may also have been utilized as an adze by merely shifting the handle fixation from a vertical to a horizontal plane.

HOE.—In many huts a hoe can be found nowadays; it is used on the fields and in clearing away the grass and weeds growing in front of the dwellings. The hoe is of recent introduction and is known by its English name (u).

KNIFE.—Large knives (M.: *skiro*, *kisuro*, from the Spanish "cuchillo"; S.: *kohbil*) now form part of every household.

252 SUGAR MILL.—A primitive sugar mill (M.: *trañko;* T., P.: *tisnak tãihnin;* U.: *tisnak panka*) is employed by these Indians to squeeze the juice out of sugarcane. A stout post is buried partly in the ground, so that it will reach about 3 or 4 feet above the surface. Close to its upper extremity a wooden slab is mortised in and wedged tight. Just above this slab, which looks like a small platform, there is a hole in the post, where a stout bar (M.: *mihta;* S.: *tiñ*) fits loosely. One of the women lays a piece of cane on this "platform," her husband inserts the pole in the hole and presses downward, crushing the cane, whereupon the juice flows into a receptacle placed on the ground. The woman slips the cane forward until every part of it is crushed, and finally twists it like a rope to wring out all the juice.

252 This mill is common in the regions bordering on the Caribbean
171 Sea. Several mills of this type, found in South America and on the Isthmus of Panama, have been figured by Nordenskiöld.[24] It is well known that sugarcane was introduced into the New World by the Spaniards; still this type of mill is never met with among the whites. On the other hand, the negroes of eastern Central America and the Bush negroes of Guiana use it commonly, more so than the Indians themselves. According to the prominent African specialists Seligman and Lindblom, sugar mills of this type are not met with in the Dark Continent. Neither are they known from Melanesia. Nordenskiöld[25] believes, therefore, that this implement has been invented by American Indians in post-Columbian days, when they had become acquainted with sugarcane. In view of the fact that this sugar mill is more common among the negroes than among the Indians, I am inclined to believe that it is a post-Columbian invention made in America (probably in the West Indies) by negro slaves, who were largely employed on the sugar estates. Even to this day it is not met with among the Sumu of the interior, who crush the canes in primitive wooden roller mills turned by handspikes (cf. Wickham, b: 216; c: 206).

[24] Comparative Ethnographical Studies, vol. VIII, Göteborg, 1930, pp. 80–84, figs. 39–43.

[25] Ubi supra, p. 82.

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sashes (M.: *yalaswa;* S.: *bamaksitna*), hammocks (M.: *silmika;* S.: *wak*), and into shot bags or hunter's bags (M. and S.: *malipuk*). The long sleeveless garment, called *wipal* by the Miskito and *kiškura* by the Sumu, is not made any longer. All these cotton textiles, although coarse in texture, are soft to the touch. They are of excellent quality and the patterns are always inwoven. Sometimes a fringe of the white down of the muscovy duck extends all round the selvage. According to Exquemelin (Engl. edit.: 251) bed sheets were also made of cotton in former days by the Miskito.

SPINDLE.—The spindle (M.: *blakat;* S.: *malkat, malakat*)[37] consists of a shank made from the hard wood of the pejivalle palm. It measures from 1 to 1½ feet in length and tapers to a point on both ends. The whorl or fly is inserted at about 2 inches from the lower extremity, and the whole presents the appearance of a gigantic top. The whorl is usually made of a rare, very hard and heavy marblelike rock, which occurs in different colors and is called *kupa* by the Indians. Turtle or tortoise shell, manatee bone, clay seeds, and even heavy wood are also employed occasionally for this purpose. The shape of the whorl varies considerably; most commonly it is of conical form. The largest diameter varies from 1 to 1½ inches, and the height from three-quarters of an inch to 1 inch.

SPINNING.—A very curious method is used to spin (M.: *blakaya, bitikaya;* T. and P.: *wdinin, wdinini;* U.: *tdihnaka*). A cotton thread, drawn by the left hand of the operator from a pile which she is holding in her lap, is attached to the spindle a little above the whorl. The spindle is placed in a calabash and is made to revolve very rapidly by means of the thumb and forefinger of the right hand. With each twirling movement the spindle is kept in rotation for about half a minute by the momentum of the whorl, during which time the operator is continually drawing out cotton thread, which is then wound on the spindle. This process is repeated until the spindle is full.

WEAVING.—The cotton thread is woven (M.: *lukaya;* T.: *kilnin;* P.: *anini;* U.: *dalnaka*) on a horizontal loom (M.: *slabin;* S.: *slabin, silamba*) of most simple construction and similar to the one shown on the Mexican Codices, and still used by the Maya and other Central American tribes. It consists of a cloth beam and a yarn beam, which are connected to each other by the warp. The yarn beam is attached to a house post, about 6 feet from the ground, while the cloth beam is attached round the back of the weaver by a thick cord, enabling her to tighten the warp at will by merely leaning backward. The completed material is rolled up at the lower end. Looms of similar technique are also found in South America and Oceania.

[37] Cf. Mexican *malacatl*.

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411 barbs have been made with the aid of another file. Previous to the introduction of iron and steel the Indians made their spear points of pointed and barbed pieces of bamboo. A cord about 50 feet in length is attached to the point, while the other end of it is wound round a long reel of light wood, which acts as a "bob" or float, and is stuck at the distal end of the staff. These Indians call the float *kunkun*, which name is also applied by the Sumu to the balsa tree (*Ochroma lagopus* Sw.), from which it is usually made. Sometimes the red cedar (*Cedrela* sp.) or the roots of the "bobwood" tree (*Anona palustris*) are employed for this purpose by the Miskito.

The javelin is used only for the larger fishes, such as the carplike snook (M. and S.: *mopi*) and the salmonlike tarpon (M. and S.: *tapam, takpam*) which are frequently met with in the larger rivers.

226 Two men generally work together when fishing with this implement. The one in the bow of the boat signals his companion how to steer by motioning with the hand. They glide noiselessly over the water, and when within reach of a fish, that is, about 60 feet distant from it, the bowman stands up with the spear in his right hand and aims and throws at a single fish, which he may be unable to see through the thickness of water. The only thing visible is the fish's "wake," that is, the ripple produced on the surface of the water as he swims lazily along. By that the Indian guesses the species of the fish as well as the depth at which he swims under water. It may be 2 feet. The spear is thrown in such a manner that it strikes the water almost vertically; the Indians seldom miss, for they have practiced this sport from early childhood. Upon striking the fish, the cord unwinds; harpoon and reel become detached from the staff, but they are attached to each other by the cord. The reel acts like a float and points out the whereabouts of the prize; with its aid the latter is secured. When the fish is tired, it is drawn near the canoe, killed with a stick, and hauled in. Then the staff, which is also of floatable wood, is likewise caught.

At the beginning of the rainy season the Miskito also practice this sport at night, especially in the lagoons. At such places where the fresh water comes in contact with the sea water it blazes as the fish swims along, thus indicating the latter's presence.

On dark nights the fish is also speared with the aid of a pitch-pine torch which is held by a third man in the boat. The glare of the torch attracts the fish and enables the bowman to spy his prey, which is immediately transfixed by the harpoon. This sport of fishing with a torch is practiced chiefly in November and December.

[71] The Sumu seldom employ this fishing implement as it is of little use in the small rocky streams where the bulk of this tribe lives. On the other hand, many Creoles and Ladinos living on the coast have learned from the Indians how to handle it.

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kept in the hut for that purpose. When the Indians catch the palometa fish (M. and S.: *trisu*), they return to the water with the bones and throw them in the same spot, believing that by so doing they will always be favored with good luck when fishing for palometa. In case a woman *encinta* eats this fish, however, it will not bite any more during that season.

HUNTING AND FIGHTING IMPLEMENTS

Weapons naturally play a great rôle among primitive people, for they are used to defend themselves against the wild animals of the forest as well as against their own kind, which is even more dangerous than the beasts of the jungle. Nowadays they are not used any longer in warfare, for the various tribes are at peace, but they still furnish the Indians with the means of procuring a large share of their food supply.

DEFENSIVE WEAPONS.—Defensive weapons have gone out of existence since intertribal wars have ceased, but in former days the Miskito employed round shields (*kabaika*) of light wood or of tapir hide. Armors of plaited reed are also reported; they were covered with jaguar skin and ornamented with feathers. The northern Miskito used a breastplate of twisted cotton like that of the Mexicans (Bancroft: I, 723).

BLOWGUN.—The blowpipe or blowgun is said to be still found among the Ulwa of Rio Escondido, but the present writer was unable to obtain any details pertaining to that arm. Lehmann (c: I, 503), however, gives the name *makar* (compare Bribri *mákol*) for the blowgun among the Ulwa of Rio Murra, a northern affluent of Rio Escondido. According to Bell (b: 232) the Indian children had little blowguns to blow little balls of black wax through, in order to kill wasps, butterflies, and small house lizards. They were made from a reed, called *krasirpi*, the joints of which are about 1½ feet in length.

The use of the blowgun as a hunting and fighting implement would necessarily point to an acquaintance with arrow poison. In fact, Benito Garret y Arloví in a report from the year 1711 (Peralta, b: 59) states that some of the Miskito used arrow poison. Bancroft (I, 722–723) says that these Indians employed the juice of the manchineal tree (*Hippomane mancinella* L.) to poison arrows and darts, but he fails to indicate the source of his information. It is well known that the Chocó and Tule (Cuna, San Blas) Indians of Panama, like the Caribs of the Lesser Antilles, poisoned their arrows in former days by dipping them in the milky juice of that tree. I have not seen the tree in question on the Mosquito Coast, nor learned its native name; Zieck (69, 237), however, calls it *liwakumya* in the Miskito

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411 language, and gives this name also as that of an island among the
278 Mosquito Keys.

The secretions from an indigenous pale greenish-blue frog (*Dendrobates tinctorius*) may also have been used as an arrow poison, as is done by several tribes of Colombia.

411 LANCES AND SPEARS.—Lances and spears, tipped with fishbones or with flint, were formerly used for hunting and fighting, but to-day they are employed exclusively in fishing. (See Fishing and Fishing Implements.) Ferdinand Columbus mentions these weapons and says that they were made of palm wood, black as coal and hard as horn, and pointed with the bones of fishes. The javelin or throwing spear is evidently the weapon mentioned in old Spanish documents under the name of "vara para tirar." According to Exquemelin (Engl. edit.: 114) lances of a fathom and a half in length and tipped with a crocodile tooth were one of the principal arms of the aborigines of the Corn Islands.

SLINGS.—Small slings (M.: *prâûprâûkya*) for throwing stones are sometimes employed to kill birds.

CLUBS.—Wooden clubs (M.: *dyara prukaya;* T.: *di bâûnin;* U.: *dibâûnaka*) jagged with alligator teeth constituted a dangerous weapon in former days, but they disappeared many years ago.

BOW AND ARROW.—Bow and arrow appear to have been the principal weapon of the tribes under consideration; still they are said to have been unknown to the natives of the Corn Islands, who apparently belonged to the Kukra, a subtribe of the Sumu (Exquemelin, Engl. edit.: 114). It is known, however, that the Kukra living on the shores of Bluefields Lagoon possessed arrows, and a description thereof has been left to us by the same author, Exquemelin, whose vessel anchored at that lagoon in 1671. One morning several women slaves from this buccaneer vessel were attacked by a group of Indians and pierced by a great number of arrows. The latter were made of palm wood, 8 feet in length (5 to 6 feet according to the French edition), round in section and of the thickness of a thumb. They were tipped with sharp points of flint which were tied firmly into the arrow together with a wooden hook, so that the arrow point presented a harpoonlike appearance; the other extremity ended in a point. Other arrows had at the distal end a small wooden box, 1 foot long, filled with round pebbles, evidently in order to increase the power of the arrow. The Indians had been careful enough to put some leaves in this box in order to reduce the noise produced by the pebbles upon shooting the arrow off. Some of these arrows were painted red (Exquemelin, Engl. edit.: 247–248; Span. edit.: 446; French edit.: II, 257–258).

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used for fishing, consists merely of a shaft of wild cane into which a sharply pointed foreshaft of pejivalle wood, hardened in the fire, has been inserted and firmly tied as stated above. The latter is smoothed with the aid of a machete or large knife, which tools are used after the manner of a carpenter's plane. This kind of arrow is the largest one found on the Mosquito Coast, and it may reach 6 feet in length. Occasionally it is jagged on either side into more or less definite barbs. The arrow does not sink, owing to the feather-light shaft, which will always rise to the surface. On the Mosquito Coast the use of this arrow has also spread to some of the Creoles and Ladinos.

HUNTING ARROWS.—The hunting arrow (M.: *trisba;* S.: *sibak*) measures only 5 feet in length, as the shaft of wild cane is considerably shorter than in the one used for fishing. Unlike the latter, the hardwood foreshaft is not pointed, but a piece of iron or steel made from barrel hoops or other scrap iron is inserted in front. The latter is lanceolate in shape and has sharp edges. As the art of melting metal is unknown to these Indians, they make these arrow points with the aid of files. According to Exquemelin (Engl. edit.: 251), the Miskito in 1671 used iron points or alligator teeth to tip their arrows. Flint, obsidian, turtle shell, sharp fishbone, and shark teeth [47] were also used for this purpose in former days. Barbed arrows and trident or composite arrow heads are now unknown.

BIRD ARROWS.—For birds and small animals the Indians make use of small arrows with blunt knobs of hardwood or beeswax, called *uru* by the Miskito and *ubo* or *ubur* by the Sumu. With these arrows they seldom kill, but merely stun the game, so that they can capture it alive. They are also used in the houses to scare away dogs, pigs, and fowls without being compelled to get up from the seat.

QUIVERS.—Quivers (M.: *trisba taya* "arrow skin") were apparently of ceremonial use only, and they were employed to carry the arrows during the festivals. They were made of red deerskin, as is indicated by their Sumu name (T.: *sana unlak;* P.: *sana onitak;* U.: *sana okatak*). At the present time quivers have disappeared entirely, and the arrows are always carried in the hand by the hunter.

FIREARMS.—The buccaneers of the latter half of the seventeenth century apparently introduced firearms among the Miskito.[48] In

[47] The Rama still employ shark teeth to tip their hunting arrows, and they claim that a wound caused with such an arm will almost invariably be fatal.

[48] It is possible that firearms were already introduced among the Miskito at an earlier period, during the years 1630 to 1641, when the two islands of Providencia and Santa Catalina, situated off the Mosquito Coast, and now belonging to Colombia, were colonized by English Puritans. The latter opened friendly and commercial relations with the Miskito, who were living chiefly around Cabo Gracias a Dios and Sandy Bay in those days. In 1633 a certain Capt. Sussex

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the Indian is working as a day laborer he will keep track of his time by tying a knot in a string every evening, and finally compares the total of the knots with the amount of days credited to him by his employer. These small cords also take the place of cards of invitation for a great festival. One of them is carried by the messenger to the headman of each one of the invited villages. Each night one of the knots is severed, the last one representing the day of the meeting.

Instead of knotted strings there are also other systems of *pyu*, as, for instance, tablets or pieces of wood on which notches have been cut with a knife, or wherein small holes have been drilled for the reception of thin sticks. The women also make use of calabashes in which they place or from which they withdraw a small pebble every day. Each one of these notches, sticks, or stones signifies a day.

The presence of these simplified *quipu* among the Miskito and Sumu has already been observed by Roberts (270) and by Sapper (c.: 265). Similar systems may be found among the Talamanca tribes of Costa Rica and in many parts of South America and Oceania. Very complicated systems are known only from the ancient Peruvians; in their elaborate *quipu* the knots varied in value according to their coordinate placing. They were used for calendary calculations and also for statistics.

DAYS.—Great distances from one place to another are expressed by the number of "sleeps" or nights that one will have to sleep on the journey.

The approximate time of the day is not observed from the length of the shadow, but directly from the position of the sun. The Indians will point to the heavens and indicate the approximate position of that celestial body at the time at which a certain action took place.

YEAR.—The Indians calculate the year according to the return of the dry season, or summer; both the words "year" and "dry season" are expressed by the same word (M.: *mani;* T., P.: *kure, kuri;* U.: *mamaka*). The approach of the rainy season, or winter (M.: *li mani, li tâim;* S.: *wasma*), or the dry season, is known from the behavior of the animal and vegetable world. Very few Indians are able to give their approximate age. The great eruption of the Cosegüina in 1835 formerly afforded a convenient reckoning period to start from.

MONTHS.—The year was formerly subdivided into 13 months or "moons" (M.: *kati;* S.: *wâiko*) of 29½ days each, corresponding to the average duration of a lunar revolution. As it was known, however, that the solar year corresponds to considerably less than 13 lunar revolutions, the thirteenth month was occasionally dropped in order to keep the moon in adjustment with the seasons. Nowadays

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534 through the shell, emerging through a small hole cut just opposite the stem end. With other specimens the handle does not pass through the calabash, but it is firmly attached to it by means of fiber strings passed through various perforations drilled in one end of the gourd. The seeds strike the inner wall of the thin shell and the central handle axis, resonating somewhat like castanets.

WIND INSTRUMENTS.—Flutes or flageolets (M.: *bra;* S.: *bara*) are in common use. They are about a foot in length, and are provided with two, three, or four finger holes. Beeswax is applied to the mouthpiece. They are made from a species of bamboo known by the Miskito name *bratara*.

Short 1-toned flutes are also made from the femoral bones of deer, tapir, or other large animals. They are used to lure the agouti by imitating the voice of that rodent, and from the purpose they serve are called *kyaki wasbaya* (M.), *malka kuñnin* (T.), *malaka kuñnini* (P.), or *malka kuñkana* (U.).

Several flutes are used exclusively at the festivals of the dead. A small flute (M.: *limi-mina, limi-dusa;* S.: *nawa-wakal*) is made of jaguar bone and has the mouthpiece covered with beeswax. Another short flute (M.: *yul*) is made from the thin *kliswi* reed. Stout bamboo flutes, measuring up to 6 feet in length, with one end resting on the ground, are blown by the sukya. This instrument has a mouthpiece of bird skin and beeswax and has a number of lateral ventholes; it produces a loud noise not unlike the roaring of wild beasts.

Panpipes are unknown in the country under consideration. Pottery whistles are no longer manufactured, but a few specimens have been unearthed in the Rio Tinto (Honduras) region.

Conches (M.: *kiptaya;* S.: *masi*) are used as trumpets throughout the Mosquito Coast.

Jew's-harps (*yusap*) were introduced many years ago and are in great favor; they produce but few tones, but the music sounds sweet and soothing and has a great charm for the Indians.

MUSICAL BOW.—The musical bow (M., S.: *lukku*), the only stringed instrument known in ancient America, produces a plaintive sound and is occasionally played by the Indian women. It is formed of a small wooden bow, chiefly of split bamboo or other tough pliable wood of 2 to 3 feet in length. Both ends of the bow are connected by a thin string of pita or silk grass. The bow is pressed against the mouth, which acts as resonator, and the string twanged by means of a pick of wood. Harrower (47) collected a large specimen on the Mosquito Coast in 1924 with a gourd for a sounding box and a string made of a heavy liana.

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171 More complicated systems are found in other parts of Central America, but practically always among the Indians. In 1912 the writer saw at Ocotal (Nicaragua) one of these instruments in the

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hands of an Indian from the neighboring village of Cuje, who called it "quijongo" or "sambumbio." It was at least 5 feet in length and 1½ inches thick. A little from the center the string was tied back to the arc with the aid of another thread, so that two strings of unequal size were formed. This instrument could produce a great variety of tones. In Olancho (Honduras) I saw later a bow of equal size but with a calabash resonator; it was called "caramba" there. The gourd was fastened with the mouth downward at the convex surface of the arc, at the same point where the cross string had been attached to the wood, that is, about one-third the distance from one end. The Rama of Nicaragua also call this instrument *lusiko*, while among the Lenca of Honduras it is known as *bumbum;* it is also found among the Kekchi of Guatemala, and was known to the Island Carib of the seventeenth century, according to De Poincy.

In spite of the fact that in Central America the musical bow is limited to the pure Indians, it is supposed to be, like all other stringed instruments, of foreign origin. The various names by which it is known in Central America savor of African origin. It is also found in certain regions of South America and has a wide distribution under different forms in large areas of Africa and Melanesia.

OTHER INSTRUMENTS.—Violins, guitars, accordions, and harmonicons may be found in certain regions; they are chiefly of German manufacture. Instead of beating the drum or shaking the rattle, the Miskito occasionally clap the hands together at the dances in order to obtain a rhythmic effect.

AMUSEMENTS: SONGS, DANCES, STORY-TELLING, GAMES, AND SPORTS

SONGS.—The Sumu rarely sing (M.: *ßwanaya;* T., P.: *ßwannin, ßwannini;* U.: *unbßmaka*), but the Miskito sing occasionally when they are either sad or happy. All their songs are soft and plaintive, and they all sound alike to the stranger, who is unable to distinguish the gay songs from the sad ones, unless he has lived some time among the Indians. The sukyas of both tribes sing upon practicing their rites of incantation, but owing to their intermingling of many old and obscure phrases, these songs are unintelligible to the other Indians.

I was unable to collect any indigenous song, but Young, Fellechner, and Bell have been more fortunate than I. In these songs appear many phrases not used in general conversation. Fellechner (268) obtained a number of songs which were apparently composed in an antique form of the Miskito language, for the interpreters were unable to give the meaning of many parts of them. Most of this material has never been published. The following specimen is that

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whistling and blowing over it for about 5 or 10 minutes. Should he suffer a relapse and undergo another treatment the sukya will demand another fee.

RELIGION: SUPREME BEING, TRIBAL HEROES, SPIRITS, CREATION OF MAN, DELUGE, CHRISTIANIZATION

SUPREME BEING.—The religious system of these tribes has been fast disintegrating for the last generation. Nowadays both tribes believe in the existence of a Supreme Deity, which the Miskito call *Wan-Aisa*, "Our Father," and the Sumu *Ma-Papak* or *Ma-Papañki*, "Our Father" or "Sun-Father." Both tribes also make use of the name *Dawan*, "Master" or "Lord." This conception has probably been borrowed from Christianity; still Exquemelin (Engl. ed.: 251) states that in his days (1671) the Miskito believed in one God. This Deity, which dwells in heaven, is sometimes confused with the various tribal heroes. According to these Indians, God has created the world and the inhabitants, but He does not appear to worry a great deal about the individual being, nor is He able to ward off the various dangers which continually menace mankind; consequently He is not honored with offerings, prayers, worship, or sacrifice. Furthermore, He lives so far away from earth that it is impossible to enter into relations with Him, and He can not be approached by man.

MINOR GODS AND TRIBAL HEROES.—Both the Miskito and the Sumu believe in the existence of a number of supernatural beings, living formerly on earth like man. These are the sun (M.: *yu, lapta;* S.: *ma*), thunder (M.: *alwani;* S.: *alwana*), moon (M.: *kati;* S.: *wčiko*), rainbow (M.: *kumadora;* S.: *wayauli, wayuli*), stars and planets (M.: *slilma;* T., P.: *yala;* U.: *ma-baka* "small sun"), the Pleiades (M.: *pupu-wihta;* S.: *kalpas*). According to a Sumu myth a bright planet, called by the Miskito *kati-maya*, "the moon's wife," which is seen just above the new moon, was originally a girl, who was raised by her finger tips by *Udo*, the moon god (Heath, c: 77). These various heavenly bodies are supposed by the Sumu to travel in canoes, a belief which is also held by the Cuna of Panama.[88]

Some of these supernatural beings are in charge of the elements and are responsible for the great calamities which appear occasionally. The god of the wind and of the air, called by the Miskito *Prahaku* or *Aubiya*,[89] sends the hurricanes and the great inundations which destroy the plantations and kill the livestock. His representative is

[88] Erland Nordenskiöld, Les Rapports entre l'Art, la Religion, et la Magie chez les Cuna et les Choco. Journal de la Société des Americanistes de Paris, tome XII, Paris, 1920, p. 150.

[89] Cf. "obi" or "obeah," a species of sorcery practiced among West Indian Negroes.

1: Conzemius M-4, 5 (1921) 1932
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The spirits may come to the neighborhood of human habitations in their anthropomorphic form and try to seduce Indians of the opposite sex, and abnormal children will be the result of this intimacy. Monstrosities among the animal and vegetable world are also held to be spirits. Just like snakes, these spirits are said to have a great passion for women at the menstrual periods.

CONNECTION OF SPIRITS WITH THE SILK-COTTON TREE.—The silk-cotton tree (M.: *sisin;* T., P.: *panya;* U.: *paniki*) is said to be the abode of the spirits of the departed, and no one ventures under it during the night. It must not be cut down, as by such an act the spirits would be robbed of their favorite resting place, and they would not fail to revenge themselves. Should it be absolutely necessary, however, to cut down a silk-cotton tree, the wrath of the spirits may be avoided by burying something at the foot of the tree in the shape of an offering, as food, red peppers, money, etc. When the tree has been felled, the object in question may be recovered. On Rio Lacus, a southern affluent of Rio Coco, a Sumu used for this purpose two small dolls or puppets (M.: *yapti;* S.: *ditalna*), which he had obtained from the sukya. This procedure, which savors of African origin, is the only case of this sort which I have met among the Sumu, but the habit in question is common enough among the Miskito.

The Indians also claim that a dugout made from the silk-cotton tree will groan continually during the night, and that at the same time it will travel with tremendous speed. A similar plaintive sound is said to be emitted during the dark by mattresses or pillows stuffed with the down adhering to the seeds of the tree. For the above-named reasons the credulous Indians make no use whatever of the haunted tree.

The Creoles and the West Indian Negroes dread this tree even more than do the Indians; according to them the spirit of the deceased, which they call "shadow" or "duppy," leaves the grave on the third day after death in order to roam about the woods, especially around the ceiba or silk-cotton trees. Some believe that these superstitions concerning the tree may have been taken from the Africans; still, the Maya of Yucatan and the Quiché of Guatemala, who have had practically no intercourse with Negroes, hold beliefs regarding the silk-cotton tree similar to those of the Miskito and Sumu. [171]

CREATION OF MAN.—As stated above, the Miskito confound Thunder (*Alasasi*) and God (*Wan-Aisa, Dawan*) sometimes with one another, and both of these supernatural beings are looked upon as the creator of man and the world in general. The Sumu, however, consider the Sun-god (*Uhubapat*) as the Almighty God and Creator of everything, and in former days are supposed to have worshiped him.

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ties the Indians will part with stone axes only for a comparatively large sum of money.

Similar superstitions about these stone celts are held by the other populations of this part of Central America. The local names "thunderbolt," "thunderstone" (Creoles), "piedra de raya" (Spanish), *alwani mahbra*, *imyula mahbra* (M.), *alwana suma* (S.), *dama up* (Rama) in themselves point to a belief in their celestial origin. They are supposed to come down from the sky with the lightning and they are held responsible for the damage done at such an occasion. They penetrate the soil to a depth of 7 feet and then slowly work their way upward, reaching the surface again in seven years. It is claimed that sometimes such a thunderbolt may be found in a tree which has been struck by lightning. The surface of these celts is always smooth; often they are highly polished. Their color is always supposed to be identical with that of the soil in which they have been discovered.[76]

DIVINING ROD.—The Sumu of Rio Prinsapolca are said to make use of some sort of a divining rod (M.: *smaya kâikaya;*[77] T., P.: *tiñ amañnin;* U.: *ya bohnaka*), consisting of a smooth rod of either cacao wood or wild cane; it is about 3 feet in length, and a cotton thread is tied around the center. The Sumu appear to use the *tapúa* for the same purpose as the Jicaque of Honduras; with its aid they claim to be able to obtain almost any information regarding the future, their luck in fishing, hunting, love-making, etc.

I have not been able to see any of these rods, nor did I obtain any definite details regarding the manner in which they are used. The following account is taken from Collinson (b: 152): "Another very common and favorite method of unraveling the unknown is an incantation by a sukya. He commences operations by cutting a small wand, peeling it, and tying a short string to its top. He then strokes it repeatedly, muttering in undertone words supposed to form an incantation; after this has been done for some time, one end of the stick is placed in the left elbow, and the right arm is stretched out to the string end. If it exactly reaches this when extended to its full

[76] Some of the Creoles and Ladinos place stone axes in their water tanks and earthen water jars, in order to keep the drinking water pure and clean and at the same time preserve themselves from certain maladies. These celts are also believed to protect the houses from lightning, and for that purpose are suspended from the roof. A "true thunderbolt," it is claimed, may be determined by tying a thread firmly around the middle of the celt, and then attempting to burn the thread. This may be done by holding a match to it, or suspending it over a lighted candle, or even throwing it in the fire. If the celt is genuine the thread will not burn. Of course such an experiment can be made successfully with any smooth stone to which a thread has been tied so firmly that there is no air intervening, thus retarding combustion of the thread until the stone itself is hot enough to burn it.

[77] Lit.: "to have a hunch."

1: Conzemius M-4, 5 (1921) 1932
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and they are not to be distinguished in their outward appearance from the ordinary mortals.

According to Miskito traditions their art was introduced by a white man from the east, known as *Almuk-awra* (lit.: "old drift man"), who was apparently some sort of culture hero. This reminds of the Mexican myth dealing with *Quetzalcoatl*, who also came from the east and was likewise a shaman. The first Sumu shaman is said to have been a man named *Ado* or *Mamañ* [80] (Grossmann, b: 4).

THE SUKYA.—This is the name of the lowest of the two kinds of sorcerers found originally among the Miskito and Sumu. The name is also current among the neighboring tribes, as the Paya and the Rama, although the indigenous designations for the priest-doctor in these two languages are respectively *wata* and *turmala*. The term sukya (sukia, suquia) [81] is also employed by the Mova and the San Blas Indians of Panama, and likewise occasionally by the Talamanca of Costa Rica. In the dialects of the Talamanca region, however, the native name is *tsukur* (or *tsugur*, *tsugru*, *tsugrūh*, *tsuku*). In the various Costa Rican languages the elements *tsu* or *ču* mean "to drink" or "to suck," and they occur in words which may be translated by "milk," "female breast"; this is also the case with other Central American languages, as Maya-Quiché, Paya, Mixe-Zoque, Lenca, Xinca, Sumu, and Guaymi-Dorasque. It would appear, therefore, that the word sukya is etymologically related to the above terms, and that originally it meant something like "sucker," as the native medicine man extracts the material cause of the pain or ill being by the action of sucking.[82]

The sukya is generally a man above the average Indian in intelligence.[83] His office is generally hereditary, but frequently he is succeeded by his nephew or his son-in-law. In practically every large village of the Miskito and Sumu habitat there is a sukya to be found; Wickham (c: 207), however, did not observe any such sorcerer among the Ulwa of Rio Escondido. The sukya communicates with the unseen powers [84] and may use his art to the welfare or destruction of

[80] *Mamañ* is, however, the Sumu name for "mother."

[81] The first mention of this name is found by M. W. (300, 302, 304, 306, 307, 308, 309) in the form *succhee*.

[82] See Rudolf Schuller, Las Lenguas Indígenas de Centro América. San José de Costa Rica, 1928 (pp. 53–54).

[83] Occasionally the sukya is an elderly woman. A young woman is, however, not qualified for this office, as she would be exposed too much to the influence of evil spirits and other supernatural dangers, especially at the menstrual period and at childbirth.

[84] Dampier (I, 9) already states that the devil, called *Wallaaw* (= *walasa*, *wlasa*, or *lasa*) by the Miskito, appears to their priest when they desire to speak to him on urgent business. M. W. (308), who writes a little later, that is, about 1699, spells that word *wallasee*.

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time he will come under the influence of some sort of tutelary spirit which henceforth will act as his protector; this may be the spirit of a person, animal, plant, hill, cloud, star, etc., or some other kind of supernatural being, by whose intermediacy the would-be sukya may converse with the evil spirits. This conception of guardian spirits is found in large areas of America, and it has probably not originated from the tutelary angel of the missionaries.

The candidate is then ready to exercise his profession, but on the day of initiation his food must be prepared according to a manner prescribed by custom. It must be cooked by a young boy or girl, not yet arrived at the age of puberty; a slender hardwood tree, called *liwŝi*, which grows very sparsely in the forest and burns readily in the green state, must be used as firewood.

The sukya is obliged from time to time to strengthen his powers by religiously abstaining from certain food and sexual intercourse, and in other ways lead a life of self-denial.

Among the Sumu any candidate for priestly and medical honors must perform the fire dance; this fiery ordeal must also be repeated occasionally in order to strengthen the connection with the unseen powers. A big pile of *liwŝi* wood is made in a cleared spot in the bush and the whole is covered by a thick layer of bijagua leaves. Fire is then put to the whole, and when in full blaze, the sukya issues from the forest. He has the whole body smeared with black paint, and is entirely naked save for a loin cloth. He then walks upon the pile and remains there standing quietly until the wood is partly consumed. Then he orders the fire divided into four parts, and walks from one pile to the other with his bare feet until all the wood is burned. Strangers are never allowed to witness this performance. The Miskito greatly respect the Sumu sukya for this act which their own sorcerers are unable to perform.

Roberts states that the fire dance is also done by the sukya of the San Blas Indians (Panama), and that the effects of the fire are resisted by some powerful antidote extracted from vegetable fibers. This ordeal is also performed by the shamans of Raiatea (Society Islands), Kandavu (Fiji Islands), and of a tribe in British India, but it has apparently not been observed in other parts of the world.

THE OKULI.—The okuli[85] is the highest shaman among the Miskito and there never should be more than one at a time. The Sumu do not have any sorcerer ranking above the sukya, but many of them recognize the okuli of the Miskito.

The okuli is said to be a special representative of *Alwani*, the thunder-god, or of *Aubiya* (or *Prahaku*), the lord of the air, and is supposed to control the elements. He is much more powerful than

[85] Among the Bribri Indians of Costa Rica olo is the name for a sort of shaman.

1: Conzemius M-4, 5 (1921) 1932
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larger beasts, like the jaguar and the puma, and kills them by introducing itself into their stomach. 925

WATER TIGER.—The water tiger (M.: *li lamya;* S.: *was nawa*) is supposed to be a manateelike animal, but covered with otterlike, glossy hair and a mane. Different species are said to exist, which have the same variety of color as the various species of Felis, the black variety being, however, the most common. This beast has webbed feet and walks awkwardly on land, but it is very swift in the water. It is found chiefly in the larger rivers among the rocks, and will devour any one swimming in the neighborhood or falling into the water; domestic animals and even men are said to have occasionally fallen victim to it. The Indians claim to have shot at it, but never succeeded in killing a specimen.

GIGANTIC BOA CONSTRICTOR.—A very large waula or boa constrictor (M.: *wáula tara;* T.: *wáula;* U.: *wayil*) with two horns on the head like a deer [96] is said to inhabit certain large lagoons in the pine ridges, far away from the nearest Indian village. It is claimed that the common waula or boa turns into such a monster when it reaches old age, and that it then retreats into deep lagoons. Man has no power to kill such a boa constrictor, as bullets have no effect on it; it can be destroyed only by a stroke of lightning.

The creeks leading to the lagoons inhabited by the monster are generally rich in all sorts of game, for no one dares to ascend them. It is claimed that in case anyone should be foolhardy enough to paddle up such a creek, presently a rumbling of thunder is heard; then the water reverses its course, flowing at a tremendous speed back to the lagoon directly into the mouth of the boa constrictor, which swallows the canoe with the intruder. The boat-bill heron (M.: *ukaka;* S.: *wakta*), a most uncanny night bird, is said to be found at the mouth of such creeks in order to warn off intruders.

FABLES OR TALES DEALING WITH BEASTS AND BIRDS

The Miskito know a great number of tales in which animals and birds act, think, and talk like human beings; they are supposed to possess spirits and to live, eat, drink, love, hate, and die just like the Indians. 538 171

These fables remind somewhat of the adventures of Ananси—a sort of god or culture hero—of the Gold Coast; or, Turtle of the Slave Coast; or, Hare (the Brer Rabbit of the United States Negroes) among the Bantu. Heath (a: 52) has drawn attention to the re-

[96] For this reason the Ladinos call it "masacuate" (from the Mexican *mazatl* "deer" and *coatl* "serpent").

1: Conzemius M-4, 5 (1921) 1932
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538 semblance of these fables with the "anancy" or "nancy" stories[96] of Jamaica, so that one can hardly doubt a common origin, and these 171 stories are certainly African.

The following Miskito fable has been given in the Indian tongue by Berekenhagen.[97] I submit herewith the English translation thereof under the title:

WHY THE HOWLING MONKEY NEVER DESCENDS FROM THE TREES

538 The tapir and the howling monkey went together into the forest. The tapir was foolish enough to play on a flute which he had inherited. When the howling monkey heard that he asked to buy the flute, but the tapir refused to sell the instrument, and kept on playing it. Then the howling monkey had an idea and he said to the tapir as follows: "As you are unwilling to sell the flute, just lend it to me for a moment to try it; whenever I shall have a flute I will also let you have it." Thereupon the foolish tapir handed the flute to the monkey. Immediately the latter hurried up a tree, whence he kept on blowing the flute without stopping. The tapir then wanted his property back, but the monkey paid no attention to him. Thereupon he became very angry and ran hither and thither in the water and among the spiny vegetation, but the howling monkey kept on playing the instrument. The tapir then decided to lie in wait for the howler, determined to kill him wherever he should find him on account of the flute. For fear of that the howling monkey does not dare to descend from the trees, not even in order to drink, and he quenches his thirst with the moisture from the leaves of the vegetation.

Beware of giving away your inheritance.

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[96] *Anancy* or *ananzi* is the term for spider in the Chi language of western Africa; this arachnid plays a great rôle in the larger part of the folk tales of the West coast of Africa from Cape Verde to Cameroon. The name "anancy story" is applied nowadays by the Jamaican Negroes to any legend, myth, or fairy tale which is being told at night, especially during a "wake." Our rural European populations likewise believe that a real ghost story ought to be told at night around the fireside.

[97] Grammar of the Miskito Language, by H. Berekenhagen. Bluefields, Nicaragua, 1894, p. 81.

2: Kirchhoff E-4 (no date) 1948
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THE CARIBBEAN LOWLAND TRIBES: THE MOSQUITO, SUMO, PAYA, AND JICAQUE

By PAUL KIRCHHOFF

INTRODUCTION

M
101 The modern *Paya* and *Jicaque* enclaves in the Caribbean Lowlands may
●171 not all be the descendants of the people so named by the first explorers
177 (maps 2 and 5). It is possible that the culture of the people first discovered on the coast was similar to that from which the present-day *Mosquito* and *Sumo* culture has evolved, although the north coast probably had culture traits that differed significantly from those of the *Mosquito* and *Sumo*. It is impossible to describe the post-Conquest changes of the culture of the *Paya* and *Jicaque*. It seems reasonably certain, however, that during the past 400 years the east coast people and the people now known as the *Paya* and *Jicaque* have converged culturally. We can, then, describe these peoples as a unit, although hypothetically their cultures have developed out of the ruins of a more complex aboriginal
G background.
177 Less important but significant features of the culture may be ascribed
175 to the contact with the *Black Carib* Indians, who were brought to the Bay Islands in 1796 and whose descendants have settled on the mainland. The importance of the early Negro influence has already been noted.

CULTURE

SUBSISTENCE ACTIVITIES

M
241 **Farming.**—A type of slash-and-burn agriculture is employed by all tribes. Every season the men clear new farmlands and burn the slash. Planting and cultivating is done with a digging stick. This is woman's work, except among the *Jicaque* (Von Hagen, 1943), and the women also harvest the crops. Some fields have combinations of crops, such as maize, beans, and peanuts; others are reserved for single crops, especially the tubers.

G A list of agricultural products may be found below. Sweet manioc,
[241 an important *Mosquito* crop, is grown by all tribes. Bitter manioc, prob-
177] ably introduced by the *Carib*, is important to some *Paya* and *Jicaque*.

3: Pijoan D-5 (ca. 1945) 1946
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The solution of ethnological problems by the helminthological approach is not without its difficulties and as such is beyond the scope of this report. On the basis of Sandground's data the prevailing hookworm infection among pure blooded Indians should be *Ancylostoma duodenale* but where Negroes have settled and intermingled the infestation becomes dominantly *Necator americanus*. In the Coco Basis, where hookworms were introduced primarily by negroes, the infestation, as far as our observations permitted, was that of *N. americanus*.

It is of interest to note that onchocerciasis was not found in the Coco Basin even though the writer thought he had found two patients with this disease. The biopsy material was poorly prepared and there was some question as to the identity of the filarial worms. That the diagnosis was probably erroneous was further strengthened by the fact that *Simulium* flies transmitting this disease were not seen. However, the limited observations in searching for the fly were by no means thorough and do not exclude the possibility of their existence or that of the disease. It may be that in years to come when commerce between natives is increased the appearance of onchocerciasis may become an obvious clinical finding.

Cases of Schistosomiasis have been reported from Panama, Costa Rica and Yucatán but none have been reported from Guatemala[70] nor were we able to find any in Central Nicaragua. Even though *S. mansoni* and *S. hematobium* are of Ethiopian origin, the appearance of negroes in the Coco Basin did not introduce the disease and this fact is ascribed to the absence of the species of snails suitable for the larval development of the parasite.

The commonest worm infestations in the Indians of the Coco Basin were *Ascaris lumbricoides* and *Trichuris trichiura*. The former was common in communities which do not possess sanitary facilities and is contracted by ingesting eggs that are expelled in the feces. The latter, "whip worms", whose eggs are able to withstand adverse environmental conditions, almost to the same extent as those of Ascaris, was commoner than the former and the "pinworm" *Enterobius vermicularis* was frequently found. *T. saginata* and *T. solium* have been noted by others in the area studied but were not observed by us.

[70] Sandground, J. H. Helminthic infections in Guatemala in a Medical Survey of Guatemala, Carnegie Institution of Washington, 1938.

3: Pijoan D-5 (ca. 1945) 1946
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them.[77] Sporadic epidemics of whooping cough have occurred in the Coco Basin and have always continued with considerable severity. Thousands of deaths from whooping cough were reported to the League of Nations in 1933 and 1934.[78] In the Coco Basin the children in a few villages have come down with this disease but because of the wide gaps between villages it has never spread entirely throughout the area. In short, the epidemics appear to become localized and have within the last 50 years decreased considerably in number. Thus, it can be said that considerable morbidity and mortality for whooping cough does occur at intervals of them but are localized in character.

Diphtheria

Diphtheria appears to be a relatively rare disease in the tropics; for instance, in the non-tropic areas such as Buenos Aires, the incidence per 100,000 persons was in 1929, 16.9; in Quebec, 23, and in Chicago in 1927, 13.8. In the tropic area in 1927 for Havana was 1.5; in 1928, 2.0; Guayaquil in 1930, 0.8; Veracruz in 1930, none; in Kingston in 1927-1929, none. Further north in Tampico the incidence was in 1930, 6.0; and in the Panama Zone in 1928, 9.9. Larsen[79] states that in the tropics diphtheria is a mild, seldom seen disease and rarely assumes epidemic proportions. This is of interest since Emerson[80] has shown that there is a significant difference in the cause and death incidence rates of diphtheria in various racial groups in New York City and he believes that the factor of race is the only one of importance which can be recognized. Be this as it may, the fact remains that today no case of diphtheria has been reported in the Coco Basin territory. This does not mean, however, that mild cases have not occurred since the disease might have been mistaken, if mild, for any of the upper respiratory diseases.

Pneumonia and Bronchial Pneumonia

At the time of our expedition through the Coco Basin we did not hear or not did we see any cases of pneumonia; however, we were in-

[77] Cann, Thomas, In an unknown land. 1924, New York.

[78] League of Nations Health Organization. Annual Epidemiological Reports, Geneva. For the year 1933, published in 1935; for the year 1934, published in 1936.

[79] Larsen, A. E. Variation of cosmopolitan diseases in tropical and temperate zones. Amer. Jour. Trop. Med., 1936, *16*, 91.

[80] Emerson, K. Future of program for tuberculosis control. Amer. Jour. Public Health. 1935, *25*, 707-711.

3: Pijoan D-5 (ca. 1945) 1946
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164 formed that pneumonia and bronchial pneumonia did exist and that at
171 certain times the disease would occur especially among infants with a very high morbidity and mortality. Pneumonia is however more common in the highland tropics. For instance, in Guatemala, where the incidence is equal to that of México, it is more than double than that for Massachusetts. The disease in the Coco Basin is not of paramount importance nor is it a public health problem. No statistics are available so that a proper description of this disease can not be given.

Tuberculosis

Hrdlicka[81] has said of pulmonary tuberculosis in Indian tribes that "this disease which in all probability is extremely rare, if it exists at all, in the prehistoric Indians, was seldom seen before a century ago (before 1808) and is gradually becoming everywhere more common". His observations indicated further that pulmonary tuberculosis in the Indian is usually fatal within a comparative short time.

But it has been noted[82] for instance in Guatemala that tuberculosis is an important cause of death in the larger cities; it is not prevalent in small communities. The real question, as raised by Shattuck, is does tuberculosis treaten to become a major problem in Central America. If so, little has been done to combat the disease in this area. Yudice[82] applied tuberculin tests to 447 children in El Salvador and found the Pirquet test positive in 47 per cent of the subjects (children 3 to 14 years old), and those in whom it was doubtful or negative gave 21 per cent positive Mantoux tests. In the reports dealing with North American Indians, Crouch[83] found 75 per cent positive among Indians of Montana and Coleman[84] stressed the view that Navajo Indians had practically no immunity to the disease. The factors involved appear to be those of racial susceptibility, poor food, bad hygiene, and the lack of treatment of contributing causes.

164 Although we were not able to secure the incidence of pulmonary tuberculosis among the Miskito Indians, two facts seeemed apparent. The first of these was that fever, cachexia, hemoptysis symptoms which developed rapidly and often terminated in death were common in the younger Indians who worked in mines. The other fact is that such

[81] Hrdlicka, Ales. Smithsonian Inst. Bur. Amer. Ethnol. 1909, Bull. 42.
[82] Yudice, Luis. Salv. Med., 217, ab. 1936. (Abstract in Bol. de la Oficina Sanitaria Pan-american, Sept. 1936, 883.)
[83] Crouch, J. H. U. S. Public Health Reports, 1932, 47, N° 38, 1907.
[84] Coleman, Nancy R. The Reservation Boarding Schools, Bull. 25, (Nov 1936), Natl. Assoc. on Indian Affairs, Inc., New York.

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Combined results of the malarial survey at Saulpaca (Zapuca) and San Carlos 164

Age	*Total N° of Persons*	*Spleen examination Positive Splenomegaly*		*Positive Blood smear for parasites*	
Years		*Saulpaca*	*San Carlos*	*Saulpaca*	*San Carlos*
0-1	40	0	11	6	10
2-4	46	2	15	13	17
5-9	128	3	52	46	55
10-14	80	2	34	27	36
15-19	41	2	18	14	20
50-54	34	0	8	8	9

the proximity of Bilwas Karma where certain public health measures have been introduced to expect a decreased incidence of disease. However the problem of clinical malaria remains a challenge and suppressive measures with atabrine or similar drugs may do much for these communities; the use of effective insect control with modern insecticides may play a major role in the future village control of insect borne disease. From the values given in the examination for malaria it is obvious that the disease constitutes the mayor health problem of the area. At Waspam, Bilwas Karma, the following mosquitoes were collected by [136] our party, these were: *Anopheles albimanus, A. albitarsis, A. aquasalis, A. argyritaris, A. parapunctipennis, A. pseudopunctipennis,* (several varieties), *A. vestitipennis, and A. crucians* (reported to be collected by Kumm). *A. albimanus* was found in great numbers and is probably the principal transmitter of malaria. This species is found in humid tropical climates and its breeding places are in the swamps exposed to the sun. However it has been known to exist at altitudes of 1350 meters (Guatemala City) and is the most common vector.

Syphilis

Hrdlicka[89] has pointed out that there is no substantial evidence 164 of precolumbian syphilis. On the other hand Williams and Wakefield, 114 Dellinger and Camp[90] regard the conclusions of their studies as being 171 sufficient to substantiate the view that syphilis was endemic in North America prior to European contacts. Regardless of controversy, sy-

[89] Hrdlicka, A. Disease, medicine and surgery among American aborigines (Gen. M. Kober Lecture). Jour. Amer. Med. Assoc. 1932, 99, 1661.

[90] Wakefield, E. G. Dellinger, S. C. and Camp, J. D., Study of osseous remains of "mound builders" of eastern Arkansas. Amer. Jour. Med. Sciences, 1937, 193, 448.

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164 philis, today among Indians, is a disease that deserves further study.
114 Dr. Mitchell Frank[91] has repeatedly stated that many cases with posi-
171 tive serologic evidence do not show clinical manifestations of syphilis nor is there anything which could be construed to indicate syphilis in the history. He points out furthermore that some of these cases on treatment have changes in serological findings but others do not. He has endeavored to perform all of precipitation — flocculation was well as the modifications of the Wasserman reactions and he is not satisfied with the status of this subject among Indians. Lynwalter[92] in 1923, in a study of Pueblo Indians found that 31 per cent had serologic evidence of syphilis and Dr. Frank does not believe that all these subjects were endowed with the disease. Plant[93] in South Dakota found serologic positives in Indians in 10.9 per cent of the men and 7.3 per cent of the women; Clarke[94] in New Mexico showed a serologic case rate of 1.5 for Indian males and 2.3 for Indian females: Dunham, Aberle, Farquhar and D'Amico[95] stated that positive serologic evidence was present in 2 per cent of the Indian children; Mountin and Townsend[96] report on incidence of 6.6 per cent among Indians studies. Pierce[97] has stated that there is something peculiar to the results obtained with precipitation flocculation tests among Indians and that the Wasserman reaction may be involved as well. Other considerations are the changing nature of the disease itself as exists over a period of years within a community and the effects of interracial marriages.

With regard to syphilis in Central Nicaragua, Rosenfeld[90] in his report stated "syphilis too is apparently very prevalent, several cases suggesting congenital and central nervous infections having been observed". It was, however, our impression that syphilis when present existed only in certain communities and rarely in others. Although there was no opportunity to perform routine serological testing, the clinical evidence of the disease was rare in all of the small

[91] Frank, Mitchell, Senior Physician, United Pueblos Agency, 1943, personal communication.

[92] From the Office of Indian Affairs, Washington, D. C. 1923.

[93] Plant, F. Paralysestudien bei Negern u. Indianern. 1926, Berlin.

[94] Clarke, W. Sangre impura in Mora: study of syphilis and certain other diseases in population of Mora County, New Mexico. Ann. of Int. Med. 1934, 7, 1936.

[95] Dunham, E. C., Aberle, S. D., Farquhar, L. and D'Amico, M. Physical status of 219 Pueblo Indian children. Amer. Jour. Dis. Children, 1937, 53, 739-49.

[96] Mountin, J. W., and Townsend, J. G. Treas. Dept. Pub. Health Service Bull. 1936, Bull. 223 (Feb).

[97] Pierce, L. F. Personal communication, 1943.

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villages on the Coco River. In and around Waspam, San Carlos, and Bilwas Karma several cases were seen which appeared to have the stigmata of the disease. Dr. Daniel F. Molloy of the Rockefeller Foundation once informed Dr. George Shattuck [82] that yaws in Honduras and in Nicaragua occurred in "nests". It was our impression that the same can be said for syphilis. Several cases were seen in and about Bilwas that were being treated and although the disease does not present itself as a major Public Health problem within the Coco Basin it is important that it be treated since there is every likelihood that it will spread.

164 114 171

Yaws

Yaws is a common disease in the tropic regions of Central America and it is often seen in the subjects of the Coco Basin. There appears to be some evidence that Yaws was an ancient disease in the Americas. Hirsch [72] and Shattuck [82] agree that yaws was an importation from Africa. In a survey of a hundred patients as San Carlos nine of them yaws, three of the subjects were boys between the ages of 10 and 18 who had the typical secondary eruption of yaws. The other six patients had a mixture of annular tertiary lesions and chronic eruptions. Treponema was demonstrated in four of the patients. Although no formal survey was undertaken, Dr. Thaeler and others[99] had the impression that the disease was common in the area. The treatment of the subjects with mapharsen and bismuth salicylate results in a dramatic response, and at the end of the third weekly injection most of the lesions had disappeared. It would appear to us that a definite program could be established with regard to the treatment of yaws wherein a sustained effort in a field project coud accomplish the treatment of the majority of the cases within a short period of time. Thus a team could enter into a territory and make a definite tour with a view of treating yaws. Although the disease would probably not be eliminated by such a measure it would no doubt be suppressed in its spread to a where it might considered a minor public health problem.

164 [757]

Pinto

The disease pinta is characterized by changes in pigmentation as a result of *Treponema Carateum* infection. Is is presumed to be of

[99] Rosenfeld, L. in his survey of March, 1943 found among 200 subjects at Raití and San Carlos, 26 of them with yaws and 18 of them with Pinta and 2 with both diseases combined.